



Control Program for Mercury in California's Reservoirs

The State Water Resources Control Board and nine Regional Water Quality Control Boards are in the process of developing a statewide control program for mercury in our waters.



Overview

Fish containing potentially harmful amounts of mercury are found in numerous reservoirs across the state. Mercury is a heavy metal that is poisonous in very small amounts. Infants, young children, and women of childbearing age are most at risk. It is known to cause brain damage as well as kidney and lung problems in humans and wildlife. To begin to address this widespread mercury contamination, the Water Boards are developing a program that will focus first on mercury in California's reservoirs.

How are humans exposed to mercury?

Most human exposure to harmful amounts of mercury is through eating contaminated fish. Toxic levels of mercury in fish are present in more than 180 reservoirs and rivers in California, making some of the fish unsafe for humans or wildlife to eat. Many of these water bodies have posted fish consumption warnings advising people to limit their consumption of certain species and sizes of locally caught fish. The methylmercury concentration in water is one of the primary factors determining methylmercury concentrations in fish.

What is "methylmercury"?

Mercury (also called inorganic mercury) is toxic in all of its forms, but methylmercury is one form that is most toxic and readily available for bioaccumulation in fish, birds, and people. Methylmercury is most often formed from inorganic mercury in open-water and wetland habitats where sediments are low in oxygen and bacteria are present.

What is "bioaccumulation"?

When methylmercury moves into water, it binds to organic matter, including phytoplankton at the base of the aquatic food web. Contaminated phytoplankton are consumed by zooplankton, which are then fed upon by small and large fish. The methylmercury accumulates in each species as it moves through the aquatic food web. The highest concentrations of methylmercury are usually found in large, old fish such as bass, which eat smaller fish.

How does mercury enter the reservoirs?

Inorganic mercury enters reservoirs and other water bodies through a variety of sources including:

- Atmospheric deposition
- Through tributary streams carrying runoff from mercury and gold mining sites
- From urban and industrial discharges
- From erosion of soils naturally enriched with mercury



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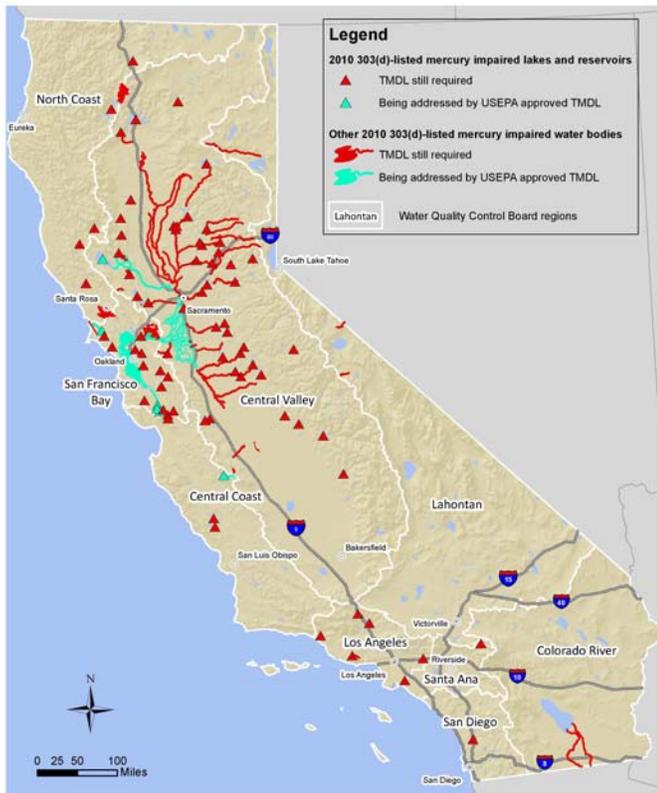
What are some potential controls for mercury?

The magnitude of mercury impairment in reservoirs is related to three factors that may be controllable:

- 1) Reductions in concentrations of inorganic mercury – Reducing concentrations of inorganic mercury in reservoir sediment are one way to limit methylmercury production and its subsequent bioaccumulation in fish. Potential source controls include remediation of historic gold and mercury mines upstream of reservoirs.
- 2) Changes in reservoir management – Depending on the local characteristics, reservoirs can create a habitat and an environment that can increase the exposure risk to fish consumers. Chemical properties such as oxygen and nutrient levels, and physical properties such as water level fluctuations, can affect methylmercury production. More information and studies are needed to determine if modifying these reservoir properties could reduce fish mercury levels.
- 3) Changes to management of fish species – Which fish species are present and how they are managed is an important factor in determining the severity of the problem in a given reservoir and changes to current practices could be an important tool in addressing mercury impairments. Stocking reservoirs with less predatory fish might limit methylmercury bioaccumulation.

Where are the mercury-impaired reservoirs in California?

Reservoirs containing potentially harmful amounts of mercury in fish are found in numerous reservoirs across the state, with the majority in central California. The map shows locations of the reservoirs that are part of this project.



For more information...

Water Board Statewide Mercury Program webpage

http://www.waterboards.ca.gov/water_issues/programs/mercury/
(Includes larger map and list of mercury-impaired reservoirs)

Office of Environmental Health Hazard Assessment Fish webpage

<http://www.oehha.org/fish.html>